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| 09/718,483 | 11/24/2000 | Toshio Hasegawa | 200089US3 | 3527 |

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EXAMINER

VANOY, TIMOTHY C

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1754

6

DATE MAILED: 07/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09-718,483

Applicant(s)

HASEGAWA

Examiner

VANDY

Group Art Unit

1754

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on date-stamped JUNE 24, 2002

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-18

is/are pending in the application.

Of the above claim(s) 1-7, 9-11 AND 18

is/are withdrawn from consideration.

☐ Claim(s)

is/are allowed.

☒ Claim(s) 8 AND 12-17

is/are rejected.

☒ Claim(s) 8, 13 AND 17

is/are objected to.

☒ Claim(s) 1-18

are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on FIG. 6 is ☐ approved ☐ disapproved.

☒ The drawing(s) filed on NOV. 24, 00 is/are objected to by the Examiner

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☒ All ☐ Some* ☐ None of the:

☒ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s) 2

☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other _____

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DETAILED ACTION

Election/Restrictions

The Applicant's election with traverse of claims 8 and 12-17 (group II) in the Restriction Response dated June 24, 2002 (paper no. 5) is acknowledged. The traversal is on the ground(s) that the search and examination would not place a serious burden on the Examiner. This is not found persuasive because examining the extra invention places the additional and serious burdens of reviewing the claims for compliance with 35USC112; extending the field of search to include the subject matter of the extra invention; considering the Applicants' arguments and amendments for the extra invention, etc.

The requirement is still deemed proper and is therefore made FINAL.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

¶a) Fig. 6 is objected to as failing to comply with 37 CFR 1.84(p)(5) because it does not include reference sign 150 mentioned on pg. 25 ln. 16 in the Applicant's specification. A proposed drawing correction or corrected drawings are required in reply to this Office Action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Obj) Fig. 6 is objected to as failing to comply with 37 CFR 1.84(p)(5) because it includes the reference sign 179 not mentioned in the description of Fig. 6 set forth on pg. 23 ln. 1 to pg. 27 ln. 2. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office Action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

a) Applicant is reminded of the proper content of an Abstract of the Disclosure.

In chemical patent abstracts for compounds or compositions, the general nature of the compound or composition should be given as well as its use, e.g., "The compounds are of the class of alkyl benzene sulfonyl ureas, useful as oral anti-diabetics." Exemplification of a species could be illustrative of members of the class. **For processes, the type reaction, reagents and process conditions should be stated, generally illustrated by a single example unless variations are necessary.**

Complete revision of the content of the abstract is required on a separate sheet.

The abstract should be amended to provide explicit examples of the "process", the "process gas", the "impurity gas" and the "reaction gas".

Claim Objections

- a) In claim 8 ln. 7, "into" should be replaced with "in".
- b) In claim 13, there is no antecedent basis in the previous claim language or in claim 12 for contacting the reaction gas with the impurity gas **in** said trap mechanism.
- c) In claim 17 ln. 3, it appears that "gas" should be inserted between "oxygen-containing" and "and".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8, 13, 14 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention.

a) In claim 8, the phrase "which is likely to react with said impurity gas in such a way as to lower the vapor pressure of said impurity gas" renders the claim vague and indefinite because:

- the claim does not particularly point out and distinctly set forth whether or not the reaction gas reacts with the impurity gas or not, since "likely to react" doesn't require any reaction at all, and
- even if there is a reaction between the reaction gas and the impurity gas, it not clear if the conversion of the impurity gas into the reaction by-product is going to change the vapor pressure of the impurity gas. It would seem that the vapor pressure of the impurity gas is going to remain the same, irregardless of whether or not it reacts or not (as a physical characteristic of that particular molecule).

Perhaps it was the Applicant's intention to recite that the reaction between the reaction gas and the impurity gas generates a reaction by-product which has a lower vapor pressure than the vapor pressure of the impurity gas (thereby, more easily condensing out the reaction by-product than the impurity gas)?

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- b) The term "large inverse diffusion coefficient" in claim 13 is a relative term which renders the claim indefinite. The term "large inverse diffusion coefficient" is not defined by the claim, the specification on pg. 32 ln. 24 to pg. 33 ln. 15 does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.
- c) Claim 14 does not particularly point out and distinctly set forth what the oxidative gas is "trapped" in. Is the oxidative gas trapped in the trap of claim 12, or is the oxidative gas merely stored in a gas storage tank (distinct and apart from the "trap" of claim 12) at an elevated pressure?
- d) Claim 17 does not particularly point out and distinctly set forth what the "vapor" is and how it differs from the "oxygen-containing".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having "ordinary skill in the art" has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 8, 12 and 17 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U. S. Pat. 5,788,747.

U. S. Pat. 5,788,747 discloses a method for removing dimethyl aluminum hydride (DMAH) out of the exhaust gas emitted from a chamber that manufactures

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semiconductor wafers via chemical vapor deposition, etc. (please see col. 1 Ins. 27-30 and col. 6 Ins. 22-37) by injecting "dry air" into a "deleterious material removing means" (40) which also receives the DMAH-contaminated exhaust gas so that the air combusts the DMAH in the exhaust gas into combustion by-products, which falls to the bottom and are, thereby, removed from the exhaust gas (please see col. 7 Ins. 48-60), in a manner that is not seen to be unobviously distinct from the limitations set forth in Applicants' claims 8, 12 and 17.

The difference between the Applicants' claims and U. S. Pat. 5,788,747 is that Applicants' claim 8 calls for the reaction gas (i. e. the "dry air" of U. S. Pat. 5,788,747) to react with the impurity gas (i. e. the "DMAH" of U. S. Pat. 5,788,747) in such a way as to lower the vapor pressure of the impurity gas, *however* it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made *because* the disclosure set forth in col. 7 Ins. 63-65 in U. S. Pat. 5,788,747 that the combustion product falls to the bottom fairly suggests that the vapor pressure of the combustion product is lower than the vapor pressure of the DMAH (which would, otherwise, pass through the "deleterious material removing means" uncombusted and entrained in the gas, if it were not combusted). Since no actual difference is seen or has been shown between the process of claim 8 and the process of U. S. Pat. 5,788,747, then claim 8 is rejected under 35USC102, as well as 35USC103.

Claims 8, 12, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 5,788,747.

Claims 8, 12 and 17 are rejected under 35USC103 for being obvious from U. S. Pat. 5,788,747 for the reasons set forth in the previous rejection.

The difference between the Applicants' claims U. S. Pat. 5,788,747 is that claim 14 calls for trapping the oxidative gas at a pressure higher than that needed at the time of evacuation, and exhausting the gas a plurality of times, *however* it is submitted that these differences would have been obvious to one of ordinary skill in the art at the time the invention was made *because*:

- it is submitted that the "dry air" of U. S. Pat. 5,788,747 will inherently be at a higher pressure than that needed at the time of evacuation due to the normally elevated pressures of gases stored in gas storage units, which are required to eject the stored gas from the unit when the gas is needed, and
- the process of U. S. Pat. 5,788,747 is expected to be cyclically repeated indefinitely to produce the requisite number of semiconductor wafers, so that the "dry air" is expected to be discharged during *each* complete production/exhaust gas cleaning cycle for each wafer (i. e. the claimed "plural times" of claim 14).

Claims 8 and 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 5,788,747 as applied to claims 8, 12, 14 and 17 above, and further in view of U. S. Pat. 6,149,729.

The difference between the Applicants' claims and U. S. Pat. 5,788,747 is that claim 13 calls for by-passing the exhaust gas around the trap when the process chamber is evacuated; claim 15 identifies the impurity as a reaction product between a

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cleaning gas and a component used in the film deposition process, and claim 16 sets forth that the process gas may be a titanium-containing gas.

U. S. Pat. 6,149,729 is drawn to the same art of manufacturing semiconductor wafers via vapor deposition, however U. S. Pat. 6,149,729 deposits titanium tetrachloride on the wafer (not the DMAH of U. S. Pat. 5,788,747) in the chamber and reports that the titanium tetrachloride is *also* deposited on the wall of the chamber (as well as the top of the wafer). The process of U. S. Pat. 6,149,729 uses chlorine trifluoride to clean the titanium tetrachloride off the walls of the chamber, thereby producing titanium tetrafluoride as a consequence of the chamber cleaning (please see col. 1 Ins. 31-56 in U. S. Pat. 6,149,729). Unfortunately, titanium tetrafluoride has a tendency to plate out of the (interior) surfaces of the exhaust vacuum line, when the titanium tetrafluoride-containing cleaning gas is evacuated from the chamber (please see col. 1 Ins. 49-56 in U. S. Pat. 6,149,729). The process of U. S. Pat. 6,149,729 solves this problem by providing a by-pass line to the main vacuum line, so that when the titanium tetrafluoride-containing cleaning gas is discharged from the chamber it is evacuated through this by-pass line (rather than through the main vacuum line), thereby preventing the titanium tetrafluoride from plating out in the interior of the main vacuum line (please see col. 2 Ins. 34-44 in U. S. Pat. 6,149,729).

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to modify* the process of U. S. Pat. 5,788,747 *by substituting* the titanium tetrachloride process gas disclosed in col. 1 Ins. 33-35 in U. S. Pat. 6,149,729 *in lieu of* the DMAH process gas disclosed in col. 1 Ins. 27-30 in U. S. Pat. 5,788,747, in

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the manner embraced in the scope of Applicants' claims 13, 15 and 16, only to achieve the expected advantage of producing the titanium semiconductor of U. S. Pat.

6,149,729 *rather than* the aluminum semiconductor of U. S. Pat. 5,788,747 *because* the courts have already determined that such substitution of another, different starting material in a known process to make another and different product does not provide for an unobvious process: please see the discussion of the *In re Durden*, 763 F.2d 1406, 226 USPQ 359 (Fed. Cir. 1985) and *In re Albertson*, 332 F.2d 379, 141 USPQ 730 (CCPA 1964) court decisions set forth in section 2116.01 in the MPEP (8th ed.).

The limitations in the dependent claims 13, 15 and 16 calling for the provision of the cleaning gas, the by-pass line, etc. are noted, but are obvious from the discussion of U. S. Pat. 6,149,729 provided in this rejection to resolve the problem of the tendency of the titanium tetrafluoride to plate out in the evacuation lines from the wafer processing chamber.

The following references, which are indicative of the state of the art, are made of record:

U. S. Pat. 6,334,928 B1 disclosing a semiconductor processing system and method of using the same;

U. S. Pat. 6,241,955 B1 disclosing a method and apparatus for purifying hydride gases;

U. S. Pat. 6,156,107 disclosing a trap apparatus for exhaust gases, and

U. S. Pat. 5,904,757 disclosing a trap apparatus.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 703-308-2540. The examiner can normally be reached on 8 hr. days.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Timothy Vanoy/tv
June 27, 2002

Timothy Vanoy
Patent Examiner

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